



# Lake Forest Hospital 3.2 MW CHP Application

## Fact Sheet

High electric utility costs and frequent power interruptions inspired Lake Forest Hospital of Lake Forest, Illinois to consider generating its own electrical power. In 1996, LaSalle Associates, a turnkey design-installer in Glen Ellyn, Illinois, installed four 820 kW Caterpillar 3516 natural gas reciprocating engines equipped with high-pressure steam heat recovery units. The CHP plant now meets 90% of the campus electricity needs and 30% of its steam load. In its first year alone, the CHP plant saved the hospital \$640,000 in energy costs while reducing the power interruptions from 50 down to two.

### QUICK FACTS

Annual Instantaneous Power Outages:	50 Reduced down to two
Annual Energy Savings:	\$640,000
Installed Cost:	\$2.7 Million
Simple Payback:	3.8 Years
Generation Capacity:	3.2 Megawatts
Operation Since:	February, 1997
Campus Size:	15 Buildings 160 Acres



### REASONS FOR CHP "HIGH ENERGY COSTS" & "FREQUENT POWER INTERRUPTIONS"

The electric prices in the Chicago land area were high while the gas prices remained relatively competitive, excellent qualifications for CHP. Also, relying on the electric utility for rate adjustments and/or curtailment programs had risk and was not cost effective for the hospital. In addition to high

energy costs, the hospital experienced 50-60 instantaneous interruptions on average each year. These interruptions impact patient care, including diagnostic equipment resets, scheduling backups, and inconvenienced patients. (i.e. it takes 45-60 minutes to reset the logic on radiographic and other sensitive, computer-controlled equipment.)

These reasons motivated Lake Forest Hospital, utilizing its own funds, to install a 2,500 sq. ft. CHP plant in 1996.

## CHP SYSTEM EQUIPMENT

- 4 Caterpillar Model 3516 lean burn engine generator sets; 820 kW ea., 1200 rpm, 60 cycle AC generator rated for 4160 V three phase power
- Maxim heat silencer units generating maximum 3600 lb./hr. of steam at 65 psi
- York 325 ton steam absorption chiller
- York 200 ton steam absorption chiller

## CHP OPERATION

CHP plant supplies power, heating and cooling to the following buildings:

- Medical buildings
- Office buildings
- Nursing center
- Laundry
- Apartments
- Child-care facility
- Learning center
- Health and fitness center
- 110-bed hospital

The CHP plant operates in parallel with electric utility during peak periods only, 9AM – 10PM, Monday through Friday excluding holidays.

CHP plant reduced peak electric costs from an average 7.5 cents per kWhr to 3.5 cents per kWhr

### LAKE FOREST HOSPITAL STEAM CONSUMPTION GRAPH

12 KVT / BOILER PLANT



\$640,000 annual energy savings

## WASTE HEAT RECOVERY

Uses of high-pressure steam heat recovery from the engine generators at Lake Forest Hospital:

- Heat
- Hot water
- Humidification
- Sterilization
- Absorption cooling
- Laundry processes
- Kitchen processes

## ADDITIONAL FACTS

- Special attention given to design of CHP building in order to satisfy unusually stringent requirements of city building review committee
- CHP supplies 90% of the campus electric load; remaining 10% supplied by electric utility
- Hospital steam load 10,000 lb./hr.
- 0.5 g/bhp-hr NOx emissions
- Engines supplied and serviced by Patten Power Systems. All servicing can be performed during weekends and scheduled downtime.
- LaSalle Associates, Inc. provided the feasibility study, design and installation of CHP plant.

Reduced annual power interruptions from 50 down to two

### For further information contact

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